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ABSTRACT

This study was designed to update the existing research and to examine the relationship between library media programs and student achievement. The schools selected for the study sample were not selected on a random basis; rather, they were library media centers (LMCs) that responded to a 1989 survey of Colorado LMCs. The study relied entirely upon available data about LMCs. The findings of the study provided evidence to make these conclusions: (1) students with better funded LMCs tend to achieve higher average reading scores regardless of wealth or education level of the schools and community; (2) the size of the LMC's total staff and the size and variety of its collection are important characteristics which intervene between LMC expenditures and test performance; and (3) the role the school media specialist plays can influence test scores. (Contains 40 references.) (JLB)

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The Impact of School Library Media Centers on Academic Achievement: An ERIC Digest

by ERIC/IT

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ERIC DIGEST

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The Impact of School Library Media Centers on Academic Achievement

Keith Curry Lance

Introduction

Advocates of school library media programs have long been convinced of the relationship between quality library media programs and academic achievement. Most studies of this relationship were conducted between 1959 and 1979, were limited in scope and usually used a small number of subjects in a limited geographical area. This study was designed both to update the existing research and to examine the relationship between library media programs and student achievement.

Methodology

Ideally, schools included in the sample for a study such as this would be selected on a random, stratified, or quota basis. None of these sampling designs was possible, because schools included in the sample had to have library media centers that responded to the 1989 survey of school library media centers in Colorado and had to use the Iowa Tests of Basic Skills (ITBS) or Tests of Achievement and Proficiency (TAP). These data were available for only 221 of 1,331 public elementary and secondary schools in Colorado during the 1988-89 school year. The study relied entirely upon available data about school library media centers and their school and community contexts to predict norm-referenced test scores.

Findings

Findings of this study provided bases for measuring the relative impact of potential predictors on academic achievement. Correlation analysis of community variables identified the following relationships:

- Rural and urbanized populations within school districts are almost mutually exclusive. In addition, there is little variation between districts that are 100 percent rural and 100 percent urbanized.
- Where more adults have graduated from high school, family incomes are higher.
- Where more adults have graduated from high school, more adults have graduated from college.
- Where more adults have graduated from college, family incomes are higher.
- Where family incomes are lower, more families live in poverty.
- Where fewer adults are high school graduates, more families live in poverty.

On the basis of these findings, the following community variables were discarded as predictors of student achievement:

- urbanized and rural percentages of population,
- college graduation and median family income, and
- percentage of families living below poverty level.

Correlation analysis of school variables identified these relationships:

- Schools with more teachers with master's degrees tend to pay higher salaries.
- Schools which spend more on instruction in general almost always spend more on supplies and materials, support services, and community services.

On the basis of these findings, the following actions were taken:

- Teacher-related variables were referred to factor analysis for potential combination into a single variable.
- Proportions of total expenditures per pupil spent on instruction, supplies and materials, support services, and community services were discarded as redundant.

Correlation analysis of library media center (LMC) variables identified the following noteworthy relationships:

- LMCs with larger book collections tend also to have more periodical subscriptions.
- LMCs which have more to spend on materials tend to have more to spend on equipment.
- LMCs which have more endorsed staff tend to have staff who spend more time identifying materials for instructional units developed by teachers and more time collaborating with teachers in developing such units.
- Numbers of books, periodical subscriptions, software packages, and videos in LMC collections tend to rise and fall together.
- Use of LMC materials, particularly audio-visual materials, appears likely to increase as teachers begin to involve LMC staff in their instructional planning.
- The well-known impact of periodical subscription prices on LMC materials expenditures is evident.

On the basis of these findings, the following actions were taken:

- A collection size factor based on numbers of books and periodical subscriptions was attempted.
- Separate dollar figures on LMC materials and equipment spending were added together to form one variable.

- Additional combinations of LMC variables were sought solely to reduce their numbers.

In terms of student achievement, in every grade, students who scored better on reading tests were likely to test better on their use of language and use of the library media center. For this reason, reading scores alone were used to represent academic achievement in this study.

After eliminating redundant variables, the next step in refining the database of potential predictors was to submit related sets of variables to factor analysis, generating several scores that were used to represent groups of related variables. Community variables submitted to factor analysis were: percentage of minority students, percentage of free lunch students, percentage of adults who graduated from high school, and average family size. The first three variables were combined into an "At-Risk" factor. Average family size was dropped from further consideration when it was realized that it was a poor way to operationalize a student's access to parental support, such as homework assistance. (If average family size is three, the typical family might be composed of two parents and one child, in which case the student is likely to be in a relatively advantageous position. Alternatively, the three might be a single parent with two children, in which case the students are likely in a relatively disadvantaged position.)

School variables submitted to factor analysis were: total expenditures per pupil, teacher-pupil ratio, percentage of teachers with master's degrees, average years of experience for teachers, and average teacher salary. The three latter variables were combined into a "Career Teacher" factor. Both total expenditures per pupil and teacher-pupil ratio were retained as separate variables because of their presumed relationships to academic achievement.

Library media variables submitted to factor analysis were:

- numbers of materials by format (books, periodical subscriptions, videos, software packages, audio-visual materials);
- numbers of microcomputers;
- numbers of media-endorsed and total staff hours per typical week;
- numbers of hours typically spent each week assisting teachers or collaborating with them in designing instructional units;
- numbers of service transactions (print and non-print circulation, information skills instruction contacts, microcomputer uses); and
- expenditures on materials and equipment.

These variables were reduced to five, four of which were factor scores representing two or more of the original variables. Anticipated factors representing staffing levels and collection size did not emerge. Instead, total staff hours per typical week and per pupil holdings of books, periodicals, and videos comprise a factor representing the staff and collection size of the library media center. This score was named the "LMC Size" factor.

Media-endorsed staff hours per week and hours library media staff spend assisting and collaborating with teachers comprised a second factor. This score, which taps the instructional role of the library media specialist, was named the "LMS Role" factor.

Weekly statistics on print and non-print circulation and information skills instruction contacts comprised a factor representing use of library media centers. This score was named the "LMC Use" factor.

Surprisingly, numbers of microcomputers in or under the jurisdiction of the LMC were unrelated to holdings figures, and weekly instructional use of microcomputers was unrelated to other kinds of LMC use. Instead, these two figures were combined in a single score called the "LMC Computing" factor.

Predictably, expenditures on library media materials and equipment were strongly related to each other. Because they are both dollar figures, these data were summed into a single amount for the remainder of this study. This total is called "LMC expenditures per pupil."

Entering the model-testing phase of this study, the original data were reduced and refined to the following variables:

- the At-Risk factor;
- Teacher-Pupil Ratio, the Career Teacher factor, Total Expenditures Per Pupil;
- the LMC Size factor, the LMS Role factor, the LMC Use factor, the LMC Computing factor, LMC Expenditures Per Pupil; and
- ITBS/TAP Reading Scores.

In the preliminary regression analyses, reading scores for almost every grade were predicted by two variables: the At-Risk factor and the LMC Size factor. Other variables predicted reading scores for only one or two grades. A second and final analysis was conducted to measure the effects of the two implicated predictors without "statistical static." At-risk conditions appear to exert great influence as younger students come into the public schools from the community, less influence during the middle years, and even greater influence as older students prepare to leave public schools. In a complementary fashion, library media programs appear to exert more influence during the middle years of elementary and secondary schooling. These apparent relationships certainly bear further study.

Multiple regression techniques also calculated the percentage of variation in test scores explained by the two direct predictors. Consistently, the At-Risk and LMC Size factors explained half or more of the variation in reading scores. After identifying and measuring the impact of the two direct predictors, the indirect effects of other potential predictors were considered with the following findings:

- The size of a library media program, as indicated by the size of its staff and collection, is the best school predictor of academic achievement.
- LMC expenditures predict the size of the LMC's staff and collection and, in turn, academic achievement.
- The instructional role of the library media specialist shapes the collection and, in turn, academic achievement.
- LMC expenditures and staffing vary with total school expenditures and staffing.
- The degree of collaboration between library media specialist and classroom teacher is affected by the ratio of teachers to pupils.

Conclusions

The findings of this study provide evidence needed to answer three major questions about the impact of school library media centers and academic achievement.

1. Is there a relationship between expenditures on LMCs and test performance, particularly when social and economic differences between communities and schools are controlled?

Yes. Students at schools with better funded LMCs tend to achieve higher average reading scores, whether their schools and communities are rich or poor and whether adults in the community are well or poorly educated.

2. Given a relationship between LMC expenditures and test performance, what intervening characteristics of library media programs help to explain this relationship?

The size of the LMC's total staff and the size and variety of its collection are important characteristics of library media programs which intervene between LMC expenditures and test performance. Funding is important; but, two of its specific purposes are to ensure adequate levels of staffing in relation to the school's enrollment and a local collection which offers students a large number of materials in a variety of formats.

3. Does the performance of an instructional role by library media specialists help to predict test performance?

Yes. Students whose library media specialists played such a role tended to achieve higher average test scores.

Limitations Of The Study

1. The Sample. Although the self-selected sample employed in this study fit the profile of public schools in Colorado and the U.S. by school level, enrollment range, and district setting, it is conceivable that some other important characteristic might distinguish this sample from the universe of public schools it was intended to represent. Numbers of schools involved in this analysis at upper grade levels were sometimes quite small. A larger overall sample would probably eliminate this problem.

2. The Data. By far the greatest data limitation is the use of the ITBS and TAP to operationalize academic achievement. During this study, a revolution in testing has begun. Future research may enjoy the benefit of more authentic assessment data. Subsequent studies will also have the advantage of access to 1990 U.S. Census data on a wide variety of demographic, social, and economic conditions that probably affect academic achievement. Other potential school predictors of academic achievement should be considered in future research. Alternative teaching styles, disciplinary issues, and student turnover are just a few such variables for which data were unavailable to this study. Subsequent studies might also consider other library media variables, such as: how access to the LMC is scheduled, how information skills are taught, and how technology is used in the LMC.

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